

REMARKS

By the *Office Action* of 13 January 2003, Paper No. 7, Claims 1-77 are pending in the Application, and all rejected. By the present *Response and Amendment*, the Applicant leaves unchanged Claims 1-17, 19-24, 26-57, 59-64 and 66-77, amends Claims 18, 25, 58 and 65, and adds new Claim 78. No new matter is believed introduced by the present *Response and Amendment*. It is respectfully submitted that the present Application is in condition for allowance for the following reasons.

1. Amended and New Claims

Claims 18, 25, 58 and 65 have been amended to further distinguish the present invention from the cited art. Notwithstanding the rebuttal arguments presented below showing that the Claims of the present Application are believed allowable without amendment, Claims 18, 25, 58 and 65 have been amended to recite that plurality of peripheral regions are either *non-concentric*, or *non-elliptical*. Such an arrangement of peripheral regions is neither taught nor suggested in the cited art.

It is thus respectfully submitted that all the pending Claims are allowable, but specifically through amendment, Claims 18, 25, 58 and 65 are allowable, and that those Claims depending from Claims 18, 25, 58 and 65 (being Claims 19-24, 26-31, 59-64 and 66-70) are allowable as well.

New Claim 78 is submitted.

2. U.S. Patent No. 6,319,150 to Werner et al.

The present invention is an improvement over a Werner et al.-type club head. Werner et al. simply discloses a club with a varying thickness face wall, and provides one example of such thickness changes. The present invention provides a wall face of a club that has a specific range of flexure. In fact, Claims 1 and 39, the only independent Claims, *do not* recite any limitations as to face wall thickness, but only to a very precise range of flexure. Werner et al. is silent on ranges of flexure, and it is respectfully not clearly understood how such silence in the reference can provide a § 102 rejection.

The object of Werner et al. is to provide a face wall formed to realize maximum face strength with minimum face mass. As such, Werner et al. discloses a face wall that has a varying thickness. That is it, and that puts the reference in the company of many prior art references that

disclose varying the face wall thickness of a club. But this is not what is claimed in the present Application. The present invention is concerned with, and the Claims specifically recite, limitations as to variations in a range of flexure of the face. That Werner et al. attempts to provide a larger sweet spot by varying the face wall thickness is a long way from disclosing the present invention's use of limiting the range of flexure in the face.

Werner et al. discloses no specifics as to sweet spot size or configuration, discloses no specifics on flexural ranges, discloses no specifics on spring constants. The *only* specifics Werner et al. provides is a depiction of varying thickness of the wall face shown in **Fig. 3**.

The Werner et al. reference is no different in presenting a club with varying face wall thickness than prior art discussed in the present Application, which is decidedly distinguished by the present Claims. For example, a varying thickness wall is disclosed in Japanese Patent Laying-Open No. 9-192273, as disclosed in the Application:

Japanese Patent Laying-Open No. 9-192273 (1997) discloses a golf club head of a metal according to second prior art, which is provided with a face center part in a thickness having sufficient strength for withstanding impact applied by collision with a golf ball and a peripheral part having a smaller thickness than the face center part. *Specification, Page 1, Lines 18-21.*

At least one distinction between this Japanese reference and the present invention, which is similar to the distinction of the Werner et al. reference, is that the change in face thickness is *not* related to a specific range of flexure, *nor* an elliptical hitting zone:

In the golf club head according to the second prior art (Japanese Patent Laying-Open No. 9-192273), the peripheral portion is not arranged in response to the hitting point distribution of the player either and hence the carry of a golf ball is remarkably reduced by an offset shot although the ball carries enough when hit at the face center of this golf club head. *Specification, Page 3, Lines 15-19.*

That Werner et al. discloses varying thickness of the face wall provides *no insight or teaching* of the recitations of Claim 1 of the present Application, that

- a flexural range, defined in the face of the head, has a *range of quantity* of flexure in a direction perpendicular to the face of at least 45%, and not more than 95%, of the maximum quantity of vertical flexure of the face (the term "flexural range" stands for a partial region of the face flexed in excess of a prescribed quantity when a vertical load exceeding a prescribed value is applied to the face), or
- a flexural range *arranged* according to a hitting point distribution range of a player in the face.

Neither of these limitations are taught in Werner et al., nor are they inherent in the club of Werner et al. Werner et al. is silent to both of these recitations of Claim 1. There is nothing in Werner et al. that teaches ***not only that*** the face wall has a varying thickness, ***but also that*** a range of quantity of flexure be so managed as not to fluctuate beyond a certain range - so that off-center shots are still provided with proper bounce characteristics.

The Examiner states that it is inherent that if a face is made thicker in the center of the face plate, such design allows a golfer to hit the ball anywhere on the face surface other than the center of the face. *Office Action, Page 2.* Applicant respectfully traverses this allegation, which basically states that Werner et al. will anticipate all future patents granted on golf clubs with varying thickness face walls. This is an overly broad reading of Werner et al., and ignores the claimed recitations of the Application.

Second, what the Examiner suggests is disclosed in Werner et al. is *inapposite* to the present Claims, and whether they are anticipated or non-obvious. Claim 1 of the present Application recites *no language* about varying the thickness of the face wall, or that a golfer can hit a ball anywhere on the face surface other than the center of the face. Claim 1 very precisely defines a club face that provides a fairly consistent flexural range of at least 45%, and not more than 95%, of the maximum quantity of vertical flexure of the face. No such teaching or suggestion can be found in Werner et al. to limit its face wall to a very specific range of flexure.

It is further respectfully submitted that it is neither inherent nor obvious that varying the face wall thickness as disclosed in Werner et al. (which is only shown with specifics in **Fig. 3** from 6.86 mm to 5.08 mm in perfectly concentric ellipses having a zero angle with the ground) provides a club face with the claimed range of flexure of the present invention.

To the contrary, the present Application illustrates that clubs with varying thickness face walls have, in fact, a very large range of flexure, and clearly outside the recited range of Claims 1-3. Tables 2-5 illustrate that even with varying thickness face walls, the range of flexure is quite wide, and well outside the range of Claims 1-3. Claims 1-3 ***do not*** recite that the clubs have a varying thickness of face wall, but that ***a range of flexure is well managed***, and Tables 2-5 show that clubs like those in Werner et al. suffer the specific disadvantages the present Application attempts to overcome. As shown in *Specification, Page 12, Line 29 - Page 14, Line 11*:

Tables 2 to 4 show the thickness distributions of the models 1 to 3 respectively.

Table 2

Major axis (mm)	Minor axis(mm)	Thickness (mm)
10	5	3.0
15	7.5	2.9
20	10	2.8
25	12.5	2.7
40	20	2.6

Table 3

Major axis (mm)	Minor axis (mm)	Thickness (mm)
10	5	3.0
15	7.5	2.9
40	20	2.6

Table 4

Major axis (mm)	Minor axis (mm)	Thickness (mm)
5	2.5	2.6
7.5	5	2.7
10	7.5	2.8
12.5	10	2.9
40	20	3.0

Table 5 shows quantities of flexure (unit: mm) measured by applying loads to the points a, b and c of the models 1 to 3 along the major axes on positions of 0 mm along the minor axes.

Table 5

Position of Load in Direction of Major axis	unit (mm)		
	Model 1	Model 2	Model 3
0 mm Point a	0.428	0.443	0.478
10 mm Point b	0.296	0.307	0.338
20 mm Point c	0.206	0.214	0.172

As shown in Table 5, the model 3 exhibiting a quantity of displacement of 0.478 mm at the face center is displaced only by 0.172 mm, i.e. 37 % of the displacement at the face center, at the offset position of 20 mm. Consequently, the model 3 exhibits rather inferior bounce in an offset shot.

On the other hand, the models 1 and 2 having thicknesses reduced from the face centers toward the peripheries exhibit remarkably larger quantities of

flexure of 0.428 mm and 0.443 mm at the face centers respectively as compared with a sample of the model 1 having a thickness of 3 mm shown in Table 1 with flexure of about 48 %, i.e. about half the quantities of flexure at the face centers, at the offset positions of 20 mm. Therefore, bounce of this type of golf club head in an offset shot can be improved by reducing the thickness of the face from the face center toward the periphery.

Table 5 of the present Application illustrates that varying the face wall thickness even .4 mm over 20 mm leads to a variation of flexure of 37% of the maximum quantity of flexure, *which is outside the limits of Claim 1*. The variation of face wall thickness in Werner et al. is 1.78 mm as shown in **Fig. 3** over 50+ mm, and .26 mm over 20 mm. There is simply no teaching in this reference that such variations of face wall thickness would provide the range of flexure as recited in the Claims. Further, the wall thicknesses of Werner et al. are from 6.86 to 5.08 mm, while the wall thickness in Tables 2-4 range from 2.6 mm to 3.0 mm.

Even if the Examiner maintains the rejection of Claim 1 by holding that Werner et al. shows a range of flexure of between 45%-95% of maximum flexure, Applicant respectfully submits that the rejection of the even narrower ranges of flexure recited in Claims 2 and 3 (70%-95% and 90%-95%) cannot be maintained, as these ranges surely are not disclosed in the Werner et al. reference, and are not simply design characteristics inherent in the Werner et al. reference club.

Other of the presently § 102 rejected Claims go even further in defining the shape, location, and other characteristics of the flexure range, and such recitations are not shown in Werner et al. The flexural range is the region enclosed within the ellipse 16 of, for example, **Figs. 7-23**. The present Application places preferred size and location limits of the flexural range, for example:

Therefore, the area of the flexural range having the aforementioned spring constant is at least 75 mm² and not more than 1260 mm², preferably at least 75 mm² and not more than 707 mm², and more preferably at least 75 mm² and not more than 314 mm². Further, the area of the flexural range is preferably at least 3 % and not more than 50 % of the area of the face 2, and more preferably at least 5 % and not more than 30 % of the area of the face 2. *Specification, Page 18, Lines 9-15.*

The area of a hitting point distribution of a low handicapper is about 150 mm² and that of a hitting point distribution of the general player is 1500

mm², and hence the area of the flexural range is preferably 150 to 1500 mm². *Specification, Page 18, Line 31, Page 19, Line 1.*

Various of the Claims recite specific location and sizes of the flexural range, which recitations are not disclosed in Werner et al. For example, Claim 6 recites an inclination of a major axis of the flexural range, again to which Werner et al. is silent.

It is respectfully submitted that the present Claims are novel over Werner et al.

3. U.S. Patent No. 5,318,300 to Schmidt et al.

The Examiner states that Schmidt et al. teaches that the striking face has variable thickness from a heel to toe region, and thus rejects Claims 19-20, 59-60 and 66-67. Yet each of these rejected Claims has yet *another* recitation that is not shown by the Examiner to be disclosed (or taught or suggested) in Schmidt et al. Claims 19-20, 59-60 and 66-67 all include the following recitation:

wherein a portion of said face having the maximum height from a sole is located on the side of a toe

This particular recitation is *in addition* to the Examiner's suggestion that Schmidt et al. discloses variable thickness from a heel to a toe region. An example of this limitation is shown in **Figs. 9 and 14** (as opposed to the maximum height being in the middle, or located on the side of a heel, as in Schmidt et al. and **Figs. 7-8** of the present Application.).

It is respectfully submitted that the above Claims are non-obvious over Schmidt et al. and Werner et al. as neither reference teaches or suggests that "a portion of said face having the maximum height from a sole is located on the side of a toe".

4. U.S. Patent No. 6,354,962 to Galloway et al.

Galloway et al. discloses a club head having concentric, elliptical regions of varying thickness. *Col. 8, Lines 10-34.* The annular rings of equal thickness radiate from a center of the face, and provide for a symmetrical varying of face thickness. The same can be said of the disclosure of Werner et al. (**Figs. 3 and 12**).

In the club heads of the present invention as illustrated in **Figs. 9-12, 14-17, 19, 21, 23-51**, as examples, the regions **140, 141, 142 and 143** are *non-concentric, non-elliptical* regions of constant thickness, wherein in some embodiments the face *will not* have a symmetrical face thickness. The regions **140-143** are discrete regions, not annular, nor stacked one within the other.

Claims 18, 25, 58 and 65 have been amended to clarify that the plurality of peripheral regions of the present invention are quite distinct from those disclosed in either Galloway et al. or Werner et al.

5. Claims Rejections under 35 U.S.C. § 102

Claims 1-18 and 39-57 are rejected under 35 U.S.C. § 102(b) as being anticipated by Werner et al. Applicant respectfully traverses this rejection as Werner et al. neither teaches nor suggests a flexural range as limited by the present Claims, as fully described above. While it is no doubt the intent of Werner et al. to provide a larger hitting face on a club, it simply does not provide a teaching of limiting the flexural range to a percentage of a maximum quantity of vertical flexure or of a spring constant. (All Claims).

Nor does Werner et al. disclose a specific range of inclination of a major axis of the flexural range. (Claims 6-9, 47-50).

Nor does Werner et al. disclose anything but concentric, elliptical variations in thickness, as opposed to non-elliptical shapes. (Claims 10-11, 18 and 51-52).

6. The Claims Rejection under 35 U.S.C. § 103

Claims 19-20, 59-60 and 66-67 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Werner et al. in view of Schmidt et al. Claims 21-38, 58, 61-64, 68-70 and 72-77 are rejected under 35 U.S.C. § 103(a) as being unpatentable over prior art as to Claims 1-20, and in view of Galloway et al. Claims 65 and 71 are rejected under 35 U.S.C. § 103(a) as being unpatentable over prior art as to Claims 1-20, and in view of Galloway et al.

Applicant respectfully traverses these grounds of rejection, as it is above-noted that Werner et al. does not disclose, teach or suggest “range of flexure” recitation of the present Claims, nor do Schmidt et al. or Galloway et al. teach or suggest:

- a portion of said face having the maximum height from a sole is located on the side of a toe
- non-concentric regions of constant wall thickness
- non-elliptical regions of constant wall thickness.

7. Fees

New Independent Claim 78 is presented, and no Claims are canceled. As the original application was filed with two (2) independent Claims, the application has now three (3) independent Claims pending, and thus no fee for additional independent Claims are required. Yet, new Claim 78 is an additional Claims over twenty (20), thus a fee of \$18.00 is included.

Further, this *Response and Amendment* is being filed within three months of the *Office Action*. Thus, it is believed no Claim or extension of time fees are due, although authorization to charge deposit account No. 20-1507 is given herein should fees be due.

CONCLUSION

By the present *Response and Amendment*, the Application has been in placed in full condition for allowance. Accordingly, Applicants respectfully request early and favorable action. Should the Examiner have any further questions or reservations, the Examiner is invited to telephone the undersigned Attorney at 404.885.2773.

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail (Label No. EL812796932US) in an envelope addressed to: Commissioner for Patents, Box Fee Amendment, Washington, D.C. 20231, on 9 April 2003.

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